

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

2. Some of the figures, including possibly Figs. 1, 3-7, 9, 10, 13-16, and 18, should be designated by a legend such as "Prior Art" or "Related Art" because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Response to Arguments

3. Applicant's arguments filed 12 January 2009 have been fully considered but they are not persuasive. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

As discussed in the Interview Summary attached to this office action, the amendment to claim 1 adding the word "ferroelectric" distinguishes over the devices of the prior art references *Baur*, *Tanaka*, and *Takatori*.

Regarding the previous rejections under 35 USC 112, 2nd paragraph: upon further consideration, it appears that the claim limitation "the liquid crystal material shows almost no spontaneous polarization which is perpendicular to the pair of the substrates under the absence of an externally applied voltage shown by substantially no peak shape current when a triangular voltage of 0.1 Hz, 5V at 24° C is applied" would be clear to one of ordinary skill in the art, considering the applicant's discussion of Figs. 12 and 13, for instance, and the amendment adding the "ferroelectric" limitation which excludes the device of *Tanaka*, which was discussed in the previous rejection. The previous rejections under 35 USC 112, 2nd paragraph, are therefore withdrawn.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by *Nishimura et al.*, US 2001/0030731.

Nishimura discloses [see Fig. 5, for instance] a liquid crystal device comprising at least a pair of substrates [1a, 2a] and a ferroelectric liquid crystal material [3] disposed

between the pair of substrates, wherein an initial molecular alignment in the liquid crystal material has a parallel or almost parallel direction with respect to the alignment treatment direction for the liquid crystal material [see paragraph 0041-0042, for instance].

Nishimura does not explicitly disclose (and is silent regarding) whether the liquid crystal material shows almost no spontaneous polarization which is perpendicular to the pair of the substrates under the absence of an externally applied voltage shown by substantially no peak shape current when a triangular voltage of 0.1 Hz, 5V at 24° C is applied. However, the prior art product seems to be identical except that it is silent as to what appears to be an inherent characteristic of the device (this claim limitation) [see MPEP 2112].

The examiner provides the following rationale and evidence tending to show inherency. The device of *Nishimura* uses a very strong anchor effect between the liquid crystal molecules and the alignment layers [1c, 2c] as discussed in paragraph 0044, for instance, to obtain an initial molecular alignment as shown in the middle of Fig. 5. This appears to be exactly analogous to the initial molecular alignment shown in the two "E=0" columns in the applicant's Fig. 11A. Upon applying an electric field, *Nishimura* discloses that the liquid crystal molecule alignment changes to that shown either on the right of Fig. 5 [analogous to 2nd column from the right in Fig. 11A] or on the left of Fig. 5 [analogous to the 6th column from the right in Fig. 11A]. As explained in the applicant's specification [see the discussion of Fig. 11, for instance], this E=0 arrangement does not have a spontaneous polarization which is perpendicular to the pair of substrates. It also

appears that the reason for this lack of spontaneous polarization, a strong anchoring to the alignment layer, is the same in *Nishimura* and in the present invention. As discussed by the applicant [see the discussion of Figs. 12 and 13, for instance], the lack of a spontaneous polarization at $E=0$ results in substantially no peak shape current when a triangular voltage is applied as recited. Therefore, there is a strong rationale tending to show that the device of *Nishimura* inherently meets the claimed limitation.

Once a reference teaching a product appearing to be substantially identical is made the basis of a rejection, and the examiner presents evidence or reasoning tending to show inherency, the burden shifts to the applicant to show an unobvious difference [see MPEP 2112].

Claim 1 is therefore rejected as anticipated by *Nishimura*.

The liquid crystal molecular alignment treatment for the liquid crystal material is conducted by buffing [see paragraph 0041, for instance], so claim 3 is also anticipated. The device shows an extinction angle under the absence of an externally applied voltage, when the liquid crystal device is inserted between a polarizer and an analyzer which are arranged in a cross-Nicole relationship [see paragraph 0043, for instance], so claim 32 is also anticipated.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Nishimura et al.*, US 2001/0030731 as applied above, in view of *Takatori et al.*, U.S. Patent No. 6,040,889.

Nishimura may or may not explicitly disclose the liquid crystal molecular alignment material providing a low surface pre-tilt angle [though it uses the same material, polyimide, as the present invention], and wherein the low surface pre-tilt angle is 1.5° or less [*Nishimura* is silent on the pre-tilt, though it appears that a pre-tilt near 0° is appropriate for the device from Figs. 3-5 and the discussion thereof].

Takatori discloses a liquid crystal display device wherein the liquid crystal molecular alignment material provides a surface pre-tilt angle of 1.5 degrees or less [col. 9, lines 14-29]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a surface pretilt of 1.5 degrees or less in the device of *Nishimura* to obtain a display device that facilitates the desired orientation of liquid crystal, and moreover, provides a wide viewing angle [col. 3, lines 30-34]. Claims 4 and 5 are therefore unpatentable.

8. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Nishimura et al.*, US 2001/0030731 as applied above, in view of *Kitayama et al.*, U.S. Patent No. 5,583,682.

Nishimura differs from the claimed invention because it does not explicitly disclose that the liquid crystal material shows a bookshelf or quasi-bookshelf structure

and that the helical pitch at the ferroelectric liquid crystal phase is 1.2 times or larger than the panel gap of the liquid crystal device [although with regard the latter limitation, *Nishimura* does teach that the helical pitch should be "sufficiently long", see paragraph 0050].

Kitayama discloses an LC device wherein the LC material shows a bookshelf or quasi-bookshelf layer structure and where the helical pitch at the ferroelectric LC phase is 1.2 times or larger than the panel gap [col. 4, lines 23-26]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a bookshelf or quasi-bookshelf structure and to set the helical pitch at the ferroelectric LC phase at 1.2 times or larger than the panel gap since one would be motivated to keep the LC at low temperature [col. 3, line 25] by compensating distortion or deformation due to shrinkage during structural changes [col. 4, lines 1-7] in order to minimize deterioration in display characteristics and problems with low temperature storage [col. 3, lines 25, 48-51]. Ultimately, this serves to provide an LC device with improved gradation display characteristics [col. 2, lines 8-10]. Therefore, claims 6 and 7 are unpatentable as well.

Election/Restrictions

9. Claims 8-29 and 31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 30 June 2005.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew Schechter/
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